O-Level Chemistry

Paper 2

Unsolved Topical

Past Papers With Marking Scheme

According to New Syllabus (2023-2025)

2014-2021

Title O-LEVEL TOPICAL CHEMISTRY P2

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PREFACE

Excellence in learning cannot be claimed without application of concepts in a dexterous way. In this regard one of the logical approach is to start in chunks; like chapter wise learning and applying the concept on exam based questions.

This booklet provides an opportunity to candidates to practice topic wise questions from previous years to the latest. Extensive working of Team MS Books has tried to take this booklet to perfection by collaborating with top of the line teachers.

We have added answer key / marks scheme at the end of each topic for the candidate to compare the his/her answer to the best.

MS Books strives to maintain actual spacing between consecutive questions and within options as per CAIE format which gives students a more realistic feel of attempting question.

Review, feedback and contribution in this booklet by various competent teachers of a subject belonging to renowned school chains make it most valuable resource and tool for both teachers and students.
With all belief in strength of this resource material I can confidently claim that it is worth in achieving brilliance.

Our sincere thanks and gratification to **Mr. Kamal Ahmad** who took out special time to help compile and manage this booklet. We would also like to appreciate chemistry faculty for reviewing and indorsing it.

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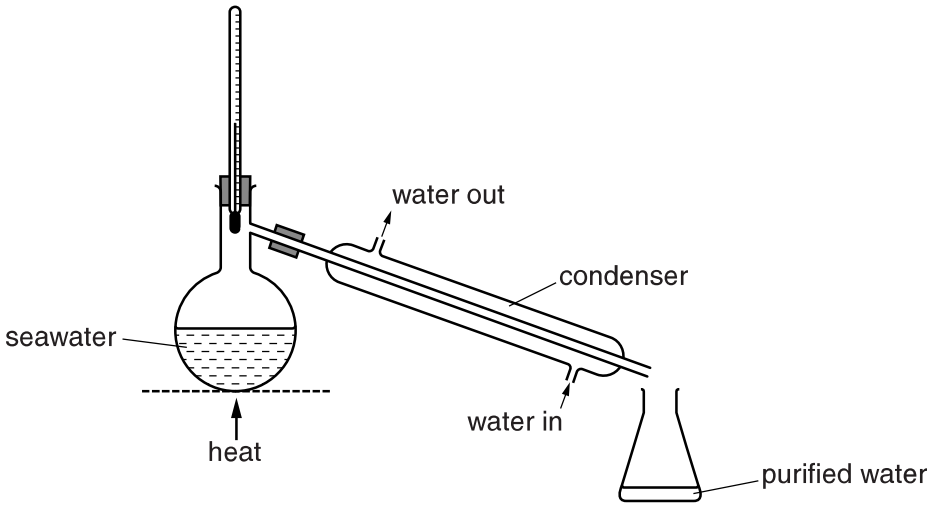
CONTENT TABLE

Experimental Chemistry

Q3/P22/O/N/14

1 Seawater contains a variety of dissolved salts.

(a) The diagram shows a simple distillation apparatus that can be used to produce purified water from seawater.



Explain how distillation purifies seawater.

.....

.....

.....

.....[3]

(b) Magnesium chloride, $MgCl_2$, is present in seawater at a concentration of $1.26\,g/dm^3$.

(i) Write the formulae for the ions present in magnesium chloride.

.....[1]

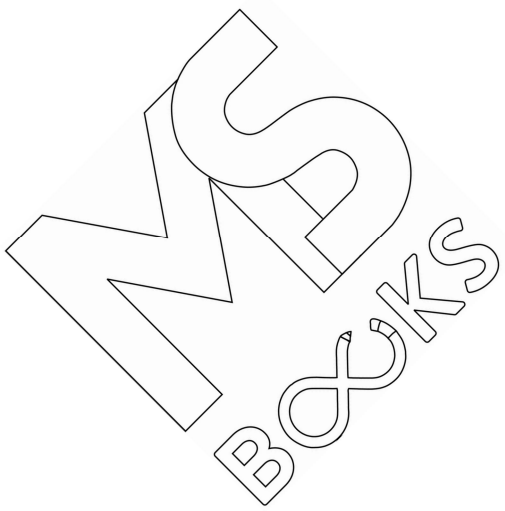
Q3/P22/O/N/14

1 **(a)** water and salts have different boiling points (1)

water evaporates **AND** salts / residues / impurities / solids left in flask (1)

water condenses / turns to liquid in the condenser (1) [3]

(b) **(i)** Mg^{2+} and Cl^{-} (1)
IGNORE: state symbols [1]



Methods of Purification and Analysis

Q3(c)/22/M/J/14

1 (c) Proteins are hydrolysed to give a mixture of colourless amino acids.

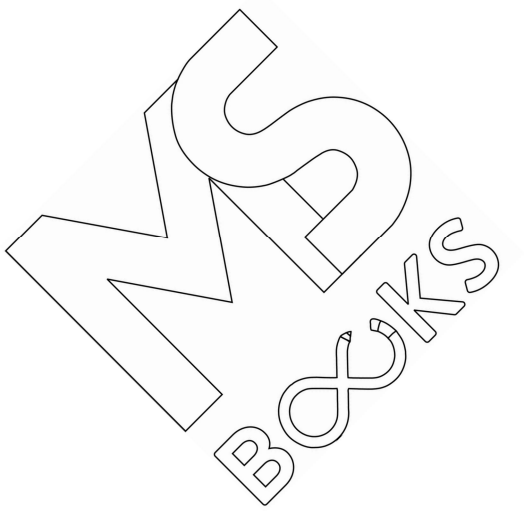
Describe, with the aid of a labelled diagram, how paper chromatography can be used to identify the amino acids present in a mixture of amino acids.

.....

.....

.....

.....[4]



Q3/P21/O/N/14

2 Paper chromatography can be used to separate metal ions in a mixture and identify them by comparison with known samples of metal ions (**A–E**).

(a) Draw a labelled diagram to show the apparatus used in paper chromatography.

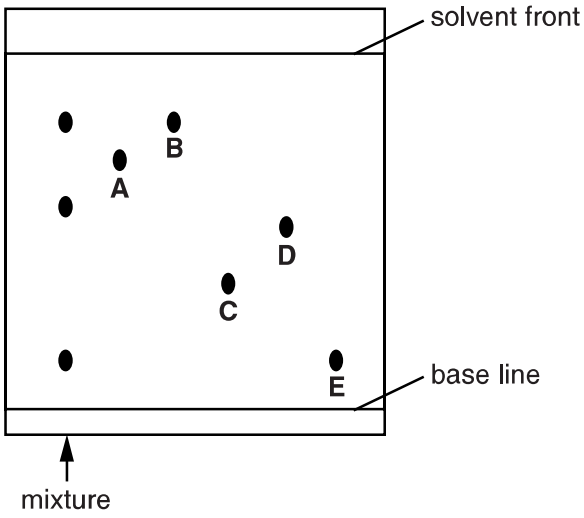
On your diagram show
- the solvent,
- where the mixture of metal ions and known samples of metal ions are placed at the start of the experiment.

.....

.....

.....[2]

(b) The completed chromatogram is shown below.



(i) Which of the metal ions, **A–E**, were present in the mixture?

.....[1]

(ii) Calculate the R_f value of metal ion **A**.

R_f value = ...[1]

(c) Ammonia can be used as a locating agent for some metal ions on the chromatogram.

(i) Suggest why a locating agent may need to be used.

.....

.....[1]

Q3(a,b)/21/O/N/19

3 Water can be removed from aqueous copper(II) sulfate by distillation.

(a) Describe how and explain why water can be separated from aqueous copper(II) sulfate by distillation.

In your answer include a description of distillation.

You may draw a labelled diagram.

.....

.....

.....

.....

.....

..... [3]

(b) Copper(II) sulfate can be prepared by heating excess copper(II) oxide with dilute sulfuric acid.

$$CuO(s) + H_2SO_4(aq) \rightarrow CuSO_4(aq) + H_2O(l)$$

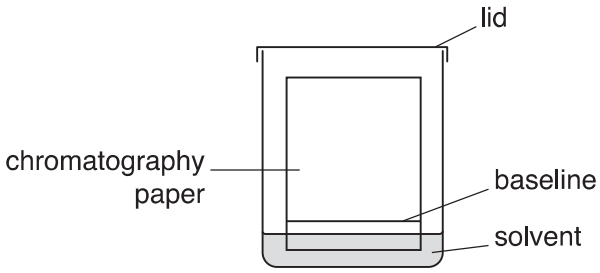
What method is used to separate excess copper(II) oxide from the reaction mixture?

..... [1]

Q9(e)/22/O/N/19

4 (e) Paper chromatography can be used to separate a mixture of amino acids.

The apparatus used is shown.



(i) Why should the baseline be drawn in pencil and not in ink?

.....

..... [1]

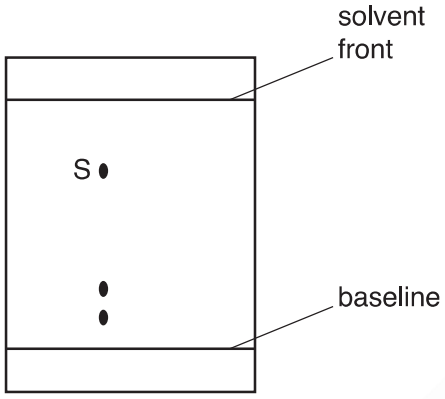
(ii) When the separation of the amino acids is complete, the chromatography paper is sprayed with a locating agent.

Explain why.

.....

..... [1]

(iii) The diagram shows the chromatography paper after it has been sprayed with a locating agent.



Calculate the R_f value of the amino acid labelled S.

R_f value ..... [1]

Q3(c)/22/M/J/14

1 (c) Chromatography paper dipped into the solvent (1)
ALLOW: chromatography paper just touching solvent (there should be no space between the solvent and the bottom of the paper)

Spot of mixture on paper above the level of the solvent labelled appropriately e.g. mixture / amino acid / amino acids / spot of amino acid / drop from sample (1)

Use of a locating agent to view the spots / amino acids / use of ninhydrin to view spots / amino acids (1)
NOTE: this must be after the chromatography

Comparing R_f values with known amino acids / compare with height of spots from known amino acids run at the same time (1) [4]

Q3/P21/O/N/14

2 (a) chromatography paper dipping into labelled solvent in a beaker (1)

solvent level below the spots at start of experiment / below base line drawn / below marked spot (1) [2]

(b) (i) **B** and **E** (1) [1]

(ii) 0.68 to 0.72 (1) [1]

(c) (i) to make the spots visible / because the spots may not be coloured (1) [1]

(ii) (light) blue precipitate (1)

(dark) blue solution in excess (1) [2]

(iii) $Cu^{2+}(aq) + 2OH^{-}(aq) \rightarrow Cu(OH)_2(s)$

correct formulae (1)

correct state symbols (dependent on correct formulae) (1) [2]

[Total: 9]

Q3(a,b)/21/O/N/19 **Q 3**

3(a)	**Any three from:** ∞ (property on which distillation) depends is the boiling point / copper(II) sulfate has higher boiling point than water / ORA (1) ∞ idea of distillation apparatus, e.g. flask connected to condenser (1) ∞ flask or solution heated (1) ∞ idea that only water vaporised (when flask heated) (1) ∞ water vapour converted to (liquid) water (in condenser) (1)	**3**
3(b)	filtration	**1**

Q9(e)/22/O/N/19 **Q 4**

9(e)(i)	ink will run / ink will undergo chromatography / pencil will not run / pencil will not move during chromatography / ink will separate / pencil will not separate	**1**
9(e)(ii)	to make the spots visible / coloured	**1**
9(e)(iii)	0.71	**1**